

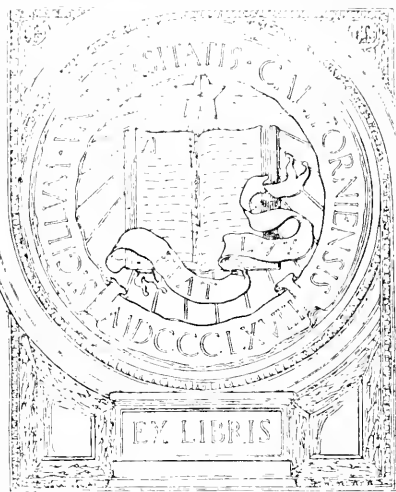
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## THE PHILIPPINE ISLANDS.

FEBRUARY 15, 1900.—Ordered to be printed.

Mr. LODGE, from the Committee on the Philippines, reported the following, in accordance with Senate Resolution No. 44:

**THE PHILIPPINE ISLANDS, A BRIEF COMPILATION OF THE LATEST INFORMATION AND STATISTICS OBTAINABLE ON THE NUMBERS, AREAS, POPULATION, RACES AND TRIBES. MINERAL RESOURCES, AGRICULTURE, EXPORTS AND IMPORTS, FORESTS, AND HARBORS OF THE PHILIPPINE ISLANDS.**

[Published under the direction of the Senate Committee on the Philippines.]

This compilation was made under authorization of a resolution of the Senate of January 9, 1900. The resolution reads:

*Resolved*, That there be compiled under the direction of the Committee on the Philippines, for the use of the Senate, the best statistics available in regard to the area, population, agricultural and mineral resources, export and import trade of the Philippine Islands, together with such other information on this subject as the committee may deem desirable.

### PREFACE.

The aim of this pamphlet is to resume in a comparatively short compass the latest and best information on the following subjects:

- § I. The numbers, areas, and names of the various islands in the Philippine group.
- § II. The numbers, names, religion, and political condition of the various native tribes inhabiting those islands.
- § III. The agriculture, inter-island commerce, transportation, and manufactures of the Philippines.
- § IV. The exports and imports of the Philippines to and from the principal countries of the world.
- § V. The mineral resources of the Philippines.
- § VI. The woods and forests of the Philippines.
- § VII. The harbors in the Philippine Islands.

The following works have been used:

For § I, an article kindly furnished by Professor Pritchett, of the Coast and Geodetic Survey, which is later to serve as an introduction to a set of maps to be published by the Coast and Geodetic Survey as a supplement to the report of the Commissioners to the Philippines.

For § II, for the population, an article by Mr. Wilcox, of the Census Bureau, embodying all the latest statistics on the subject, including those of the last Spanish census.

For the ethnography, Volume I of the Report of the American Commissioners to the Philippines and Blumentritt's *Versuch Einer Ethnographie der Philippinen*.

For §§ III and IV, the Monthly Summary of Commerce and Finance of the United States for the month of November, 1899, published by the Bureau of Statistics, and embodying the most recent obtainable information on these subjects.

For § V, the admirable article by George F. Becker on the mineral resources of the Philippines which appeared in the Nineteenth Annual Report of the United States Geological Survey, Part VI, continued, 1898.

For § VI, John Foreman's book, *The Philippine Islands*.

For § VII, a list of the names of all harbors in the Philippines which have been surveyed and charted, together with their soundings and general features (compiled from an examination of all the maps of the Philippines published by the Hydrographic Office at Washington). As far as known, there is no account of the harbors in the Philippines obtainable.

Though the above mentioned are the works which have been principally used, of course many others have been consulted, such as—

*Reisen in den Philippinen.* Jager.

*Military Notes on the Philippines*, published by the United States War Department.

*Voyages aux Philippines*, par Montano.

*The Philippines*, by Dean Worcester.

*Memorias Históricas y Estadísticas de Filipinas.* D. Rafael Diaz Arenas.

*Les Philippines.* Mallat, etc.

#### HISTORICAL SUMMARY.

The Philippines were discovered by Magellan on the 16th of March, 1521, on the day of St. Lazarus, but it was not until 1564, after several expeditions had failed, that Legaspi succeeded, with five ships, which he took from New Spain in taking possession of the archipelago in the name of Philip II. The discoverer had called the islands after St. Lazarus, but this name was not commonly in use. The Spaniards called the western islands *Islas del Poniente* and the Portuguese islands *Islas del Oriente*. Legaspi gave them their present name in honor of Philip II, who, on his side, added later the title of New Castile to the group. Afterwards Legaspi took Cebu and then Panay, and six years later he conquered Manila, which was at that time a village surrounded by palisades, and began at once the construction of a fortified city. The conquest of the remaining provinces of Luzon was so rapid that at the time of Legaspi's death, in August, 1572, the work was practically ended; but numberless wild tribes in the interior, the Mohammedan States of Mindanao, and the Sulu group have kept even to-day their independence.

The character of the population, as well as their political tendencies, favored Legaspi's conquest. There was no powerful kingdom, no old dynasty, no influential priesthood to overcome and no national pride to crush down. The indigenous races were either heathens or superficially and recently converted to Islamism, and lived under many little chiefs, who ruled with great tyranny, fighting with one another, and therefore easily overcome by the Spaniards. Such a community is

Barangay, and it forms even to-day, though in a very altered form, the basis of government among the indigenous races. The Spaniards limited the power of the native chiefs and abolished slavery. They accomplished these changes, however, with foresight and very gradually.

The conquest and pacification of the Philippines was performed for the most part by Juan de Salcedo, called the "Cortez of the Philippines." He was the grandson of Legaspi and was a man of great courage and energy. In addition to many explorations and discoveries and much fighting with hostile natives, he defeated in a series of engagements an invasion of Luzon, which was attempted by about 5,000 Chinese under the command of Li-ma-hong, a Chinaman who had been exiled from the Empire on the charge of piracy. This was in the year 1572. In 1576 Salcedo died, and in 1580 Portugal and all her colonies passed by conquest to the Crown of Spain. This was the period of the greatest power in the Philippines. It was not to endure, however, and in 1640 Portugal again became independent and her many colonies in the East were no longer governed from Manila.

The later history of the Philippines is not of any particular general interest and is not important enough to enter into in detail. Fruitless expeditions against pirates, constant trouble with the Dutch, and incessant strife between the spiritual and temporal forces in the islands fill a long series of years.

In 1762 Manila was seized by an English fleet and held for a time as a war measure. On the conclusion of peace it was again returned to the Spaniards. From then until its final cession to the United States the only events worthy of remark have been several insurrections in the island of Luzon against Spanish rule, which were all successfully repressed.

#### GEOGRAPHICAL LIMITS OF THE PHILIPPINES.

The Philippine Archipelago was ceded to the United States by treaty signed at Paris December 10, 1898.

The cession includes the islands in the geographical limits set forth by the wording of the treaty, as follows:

A line running from west to east along or near the twentieth parallel of north latitude, and through the middle of the navigable channel of Bachi, from the one hundred and eighteenth (118th) to the one hundred and twenty-seventh (127th) degree meridian of longitude east of Greenwich; thence along the one hundred and twenty-seventh (127th) degree meridian of longitude east of Greenwich to the parallel of four degrees and forty-five minutes ( $4^{\circ} 45'$ ) north latitude; thence along the parallel of four degrees and forty-five minutes ( $4^{\circ} 45'$ ) north latitude to its intersection with the meridian of longitude one hundred and nineteen degrees and thirty-five minutes ( $119^{\circ} 35'$ ) east of Greenwich; thence along the meridian of longitude one hundred and nineteen degrees and thirty-five minutes ( $119^{\circ} 35'$ ) east of Greenwich to the parallel of latitude seven degrees and forty minutes ( $7^{\circ} 40'$ ) north; thence along the parallel of latitude seven degrees and forty minutes ( $7^{\circ} 40'$ ) north to its intersection with the one hundred and sixteenth (116th) degree meridian of longitude east of Greenwich; thence by a direct line to the intersection of the tenth (10th) degree parallel of north latitude with the one hundred and eighteenth (118th) degree meridian of longitude east of Greenwich, and thence along the one hundred and eighteenth (118th) degree meridian of longitude east of Greenwich to the point of beginning.

In the description of the northern limits the line through the navigable channel of Bachi governs as against the statement that it shall follow along or near the twentieth parallel of north latitude.

## LONGITUDE AND DATE.

The cathedral in Manila is in north latitude  $14^{\circ} 35' 31''$  and in longitude  $120^{\circ} 58' 03''$ , or  $8^{\text{h}} 03^{\text{m}} 52.2^{\text{s}}$  east of Greenwich or  $10^{\text{h}} 27^{\text{m}} 55.6^{\text{s}}$  west of Washington.

Spanish maps, as a rule, reckon the longitude from the meridian of San Fernando, which is  $6^{\circ} 12' 20''$  west of Greenwich.

The date reckoning now conforms to European usage. Prior to 1845, however, there was a difference of one day. The change was made by suppressing the date following December 30, 1844, which would have been Tuesday, and calling it Wednesday, January 1, 1845.

In regard to the number and areas of the islands in the archipelago there must necessarily be a certain inaccuracy, because the group has never been properly surveyed, and the only method of determining the number and areas is by counting and measuring on the charts. The following figures are probably the best ever compiled. They are drawn from enumeration and mensuration on maps recently obtained by the United States commissioners to the Philippines and which are without doubt the most complete and the most thorough ever made. The following is quoted from the introduction to these maps, which are being published by the United States Coast and Geodetic Survey. All the islands or groups having an area of over 20 square miles have been measured, and the areas are here given in square miles and square kilometers.

Many different statements have been made in regard to the number of the islands composing the archipelago. The cause for this must be attributed to the scale of the charts on which the count was made and the difficulty of distinguishing between rocks and formations of sufficient area to dignify them by the name of islands. Thus on a small-scale Spanish chart of the entire groupe 948 islands were counted; on various large-scale charts of the same area there were found 1,725.

The principal islands, with the extent of shore line of some of them and their area, are given on the following lists. The areas were carefully measured, but are subject to the inaccuracy of the charts.

## AREA.

| Name.                             | Square miles. | Square kilometers. | Name.                     | Square miles. | Square kilometers. |
|-----------------------------------|---------------|--------------------|---------------------------|---------------|--------------------|
| Babuyan .....                     | 36            | 93                 | Mindanao .....            | 36,237        | 93,854             |
| Bagata, or Quindasag .....        | 27            | 70                 | Mindoro .....             | 3,972         | 10,387             |
| Balabac .....                     | 38            | 98                 | Negros .....              | 1,854         | 12,577             |
| Basilan .....                     | 350           | 907                | Olutanga .....            | 71            | 181                |
| Batan .....                       | 21            | 51                 | Panaon .....              | 57            | 118                |
| Bantayan .....                    | 26            | 67                 | Panay .....               | 1,768         | 12,194             |
| Bohol .....                       | 1,439         | 3,727              | Panglao .....             | 24            | 62                 |
| Bucas .....                       | 41            | 106                | Pangutaran .....          | 22            | 55                 |
| Burias .....                      | 163           | 422                | Paragua, or Palawan ..... | 3,937         | 10,197             |
| Busuanga .....                    | 328           | 850                | Polillo .....             | 231           | 598                |
| Calayan .....                     | 37            | 96                 | Samal .....               | 105           | 272                |
| Calamian .....                    | 117           | 303                | Samar .....               | 5,040         | 13,051             |
| Camiguin (Babuyan es group) ..... | 51            | 110                | Sarangani .....           | 36            | 93                 |
| Camiguin .....                    | 71            | 181                | Semirara .....            | 23            | 60                 |
| Catanduanes .....                 | 680           | 1,761              | Siargao .....             | 14            | 347                |
| Cebu .....                        | 1,742         | 4,512              | Sibuyan .....             | 131           | 339                |
| Dalupiri .....                    | 20            | 53                 | Siquijor .....            | 83            | 215                |
| Dinagat .....                     | 259           | 671                | Sulu, or Jolo .....       | 241           | 624                |
| Dumaran .....                     | 95            | 246                | Tablas .....              | 250           | 648                |
| Fuga .....                        | 21            | 54                 | Ticao .....               | 94            | 243                |
| Guimaras .....                    | 176           | 456                | Ybayat, or Ibayat .....   | 22            | 57                 |
| Leite (Leyte) .....               | 2,713         | 7,027              | Ylin .....                | 24            | 62                 |
| Linapacan .....                   | 40            | 104                | ROUTS.                    |               |                    |
| Luzon .....                       | 47,238        | 122,316            | Alabat .....              | 7             | 197                |
| Mactan .....                      | 20            | 52                 | Jomalig .....             |               |                    |
| Malhou (Homonhon) .....           | 35            | 91                 | Banton .....              |               |                    |
| Marinduqua .....                  | 287           | 743                | Simara .....              | 11            | 114                |
| Masbate .....                     | 1,290         | 3,341              | Romblon .....             |               |                    |

## AREA—Continued.

| Name.                 | Square miles. | Square kilometers. | Name.                     | Square miles. | Square kilometers. |
|-----------------------|---------------|--------------------|---------------------------|---------------|--------------------|
| GROUPS—continued.     |               |                    | GROUPS—continued.         |               |                    |
| Daram .....           | 41            | 106                | Lubang .....              | 63            | 163                |
| Buad .....            |               |                    | Ambil .....               |               |                    |
| Camotes group:        |               |                    | Golo .....                |               |                    |
| Ponson .....          | 74            | 192                | San Miguel .....          | 82            | 212                |
| Poro .....            |               |                    | Batan .....               |               |                    |
| Pasijan .....         |               |                    | Caceray .....             |               |                    |
| Calaguas group:       | 19            | 49                 | Rapurrapu .....           | 183           | 474                |
| Tinagua .....         |               |                    | Tawi Tawi group:          |               |                    |
| Guintinua .....       |               |                    | Tabulunga .....           |               |                    |
| Cuyos group:          | 28            | 73                 | Tandubato .....           | 54            | 140                |
| Cuyos .....           |               |                    | Others of the Tawi Tawi   |               |                    |
| Cugo .....            |               |                    | group .....               |               |                    |
| Agutaya .....         | 23            | 60                 | Total measured .....      | 118,542       | 307,025            |
| Hainipo .....         |               |                    | Estimated area of unmeas- | 1,000         | 2,590              |
| Bisukei .....         |               |                    | ured islands .....        |               |                    |
| Laguan .....          | 184           | 477                | Total area .....          | 119,542       | 309,615            |
| Batug .....           |               |                    |                           |               |                    |
| Limbancauyan .....    |               |                    |                           |               |                    |
| Mesa or Talajit ..... |               |                    |                           |               |                    |
| Maripipi .....        |               |                    |                           |               |                    |
| Balupiri .....        |               |                    |                           |               |                    |
| Biliran .....         |               |                    |                           |               |                    |

## LENGTH OF GENERAL SHORE LINE.

| Name.                  | Statute miles. | Kilometers. | Name.               | Statute miles. | Kilometers. |
|------------------------|----------------|-------------|---------------------|----------------|-------------|
| Bohol .....            | 161            | 259         | Mindoro .....       | 322            | 518         |
| Cebu .....             | 310            | 499         | Negros .....        | 386            | 621         |
| Jolo Archipelago ..... | 858            | 1,381       | Palawan .....       | 644            | 1,036       |
| Kalammies .....        | 126            | 203         | Panay .....         | 377            | 607         |
| Leite .....            | 363            | 584         | Samar .....         | 412            | 663         |
| Luzon .....            | 2,144          | 3,450       | Minor islands ..... | 3,505          | 5,641       |
| Masbate .....          | 244            | 393         | Total .....         | 11,444         | 18,417      |
| Mindanao .....         | 1,592          | 2,562       |                     |                |             |

## POPULATION.

The following is a quotation from an article by W. F. Wilcox, of the United States Census Bureau. It is well to notice that the last official census was in 1887 and that the figures of that census, though probably underestimating the population of the islands, are the ones which, in default of better, we are obliged to take as final. It is probable that these are an understatement of the true population of the Philippines for several reasons, among which is one not observed by Mr. Wilcox, and which is therefore mentioned. It is, of course, only supposition, but is at least suggestive. For every adult counted in the census the officials were obliged to return a poll tax. Thus, for instance, if 100,000 persons were counted 100,000 pesetas would have to be returned to the treasury. It has therefore been supposed that the officials counted, say, 150,000 and returned only 100,000 pesetas and 100,000 names.

Mr. Wilcox says (Am. Statistical Assoc. Publ., Sept., 1899):

The population of the islands in 1872 was stated in a letter to Nature (6:162), from Manila, by Dr. A. B. Meyer, who gives the latest not yet published statistics as his authority. The letter gives the population of nine islands, as follows:

|                |           |
|----------------|-----------|
| Luzon .....    | 4,467,111 |
| Panay .....    | 1,052,586 |
| Cebu .....     | 427,356   |
| Leite .....    | 285,495   |
| Bohol .....    | 283,515   |
| Negros .....   | 255,873   |
| Samar .....    | 250,062   |
| Mindanao ..... | 191,802   |
| Mindoro .....  | 70,926    |

It also gives the population of each of the 43 provinces of the islands. The population was not counted, but estimated. The number who paid tribute was stated as 1,232,544. How this was ascertained we are not informed. The total population, 7,451,352, was approximated "on the supposition that about the sixth part of the whole has to pay tribute." In reality this population is 6.046 times the assigned tribute-paying population.

But Dr. Meyer adds: "As there exist in all the islands, even in Luzon, independent tribes and a large number in Mindanao, the number of 7,451,352 gives no correct idea of the real population of the Philippines. This is not known at all and will not be known for a long time to come."

Since 1872 there have been actual enumerations of the Philippines, but authorities differ as to the time when they occurred and the detailed results. These enumerations were usually confined to the subject and Catholic population, and omitted the heathen, Mohammedan, and independent tribes.

Four reports of the entire population have been printed:

1. A report made by the religious orders in 1876 or 1877, in which the nationalities and creeds of the population were distinguished.

2. A manuscript report to Professor Blumentritt of the enumeration made by the religious orders in December, 1879.

3. The official report of the civil census of December 31, 1877, contained in *Reseña geog. y estad. de España*, 1888, p. 1079.

4. The official report upon the census taken by the civil officers December 31, 1887, and printed in the first volume of *Censo de la Poblacion de España*, at Madrid, in 1891.

The first two may be compared, and tend somewhat to corroborate each other, as follows:

|   | 1876-77.  | 1879.     |
|---|-----------|-----------|
| 1. Tribute-paying natives .....   | 5,501,356 |           |
| 2. Army .....   | 14,545    |           |
| 3. Navy .....   | 2,924     |           |
| 4. Religious officers ( <i>Geistlichkeit</i> ) .....  | 1,962     |           |
| 5. Civil officers .....   | 5,552     |           |
| 6. Other Spaniards .....  | 13,265    |           |
| Total Spaniards .....   | 38,248    |           |
| Total Catholics .....   | 5,539,604 | 5,777,522 |
| Heathen and Mohammedan natives .....  | 602,833   | 632,645   |
| Foreigners (in 1876 there were: British, 176; German, 109; Americans, 42; French, 30) ..... | 378       | 592       |
| Chinese .....   | 30,797    | 39,054    |
| Total .....   | 6,173,632 | 6,449,813 |

The third enumeration reported 5,567,685 as the tribute-paying population. To this number should be added the estimated number of the independent tribes, "Indios no sometidos;" this according to the missionaries' count was about 600,000, making a total of 6,167,685. Most experts agree that this official report is untrustworthy and involves serious omissions, but believe that the facts are so imperfectly known that they are unable to correct it.

One author, del Pac, writing in 1882, started from the missionaries' census of 1876-77, viz, 6,173,632, assumed that this omitted as many as 600,000 members of independent tribes and that the increase of 1876-1882 would be 740,000. In this way he got 7,513,632. A second writer, Sanciano,<sup>1</sup> estimated the population in 1881 as 10,260,249.

The missionaries made an estimate of their own in 1885 which showed 9,529,841.

The fourth enumeration of those mentioned above showed a population of 5,985,123 in 1887, and the totals both for the group as a whole and for the fifty odd provinces tend to confirm and to be confirmed by the civil count of 1877. This number, however, represents only the nominally Catholic or tribute-paying population. To it must be added the Mohammedan or heathen tribes set down by clerical authorities as about 600,000. Perhaps the highest authority in this field, Professor Blumentritt, is confident that this number does not include all the independent tribes, but only those in the mountains who have a special arrangement freeing them from all the dues of the subject tribes. On the whole, therefore, Prof. H. Wagner is inclined

<sup>1</sup> Sanciano, *El Progreso de Filipinas*, Madrid, 1881.



to estimate these omissions of independent or non-Christian tribes at about 1,000,000 and the population of the group at about 7,000,000. This result is indorsed by the latest German authority, Hübner's *Geographisch-Statistische Tabellen* for 1898, which gives the population as  $5,985,124 + 1,000,000 = 6,985,124$ , as follows

|                                 | Spanish census. | Estimated number not counted. |
|---------------------------------|-----------------|-------------------------------|
| Luzon and adjacent islands..... | 3,443,000       | 150,000                       |
| Mindoro and Masbate.....        | 126,000         | 100,000                       |
| Visayas Archipelago.....        | 2,181,000       | 200,000                       |
| Mindanao.....                   | 209,000         | 400,000                       |
| Calamianes and Palawan.....     | 22,000          | 50,000                        |
| Jolo (Sulu) Islands.....        | 4,000           | 100,000                       |
| Total.....                      | 5,985,000       | 1,000,000                     |

Personally I am disposed to suspect that this number, although called by Professor Wagner an outside estimate, is below rather than above the truth. In favor of this position it may be urged that Professor Wagner's estimate makes no allowance either for the natural increase of population, 1887-1898, or for the fact that the first careful census of densely populated regions, like India and Japan, usually reveals a larger population than had been previously estimated. This analogy might reasonably be applied to Luzon and the Visayas.

#### ETHNOGRAPHY.

On this subject there is a certain diversity of opinion. First an extract is quoted from the first volume of the report of the American Commissioners to the Philippines, which may be considered as the latest authority, and an article is appended based on the admirable work of Blumentritt, "*Versuch einer Ethnographie der Philippinen*," to be found in "*Dr. A. Peterman's mittheilungen aus Justus Perthes' geographischer anstalt*." These two accounts of the ethnography of the islands to a certain extent supplement each other, and it has been considered advisable to print them both, as together they certainly contain all available information on the subject.

#### THE NATIVE PEOPLES OF THE PHILIPPINES.

The inhabitants of the Philippines belong to three sharply distinct races—the Negrito race, the Indonesian race, and the Malayan race.

It is universally conceded that the Negritos of to-day are the disappearing remnants of a people which once populated the entire archipelago. They are physically weaklings of low stature, with black skin, closely curling hair, flat noses, thick lips, and large, clumsy feet. In the matter of intelligence they stand at or near the bottom of the human series, and they are believed to be incapable of any considerable degree of civilization or advancement.

Centuries ago they were driven from the coast regions into the wilder interior portions of the islands by Malay invaders, and from that day to this they have steadily lost ground in the struggle for existence, until but a few scattered and numerically insignificant groups of them remain. As a rule they are to be met with only on the forest-clad sides of the higher mountains of Luzon, Panay, Negros, and Mindanao, although in the northeastern part of Luzon they are said to still inhabit the wooded lowlands near the coast. They lead a nomadic life, wandering almost naked through the forests, and living on fruits, tubers, and such game as they can bring down with their bows and

poisoned arrows. It is believed that not more than 25,000 of them exist in the entire archipelago, and the race seems doomed to early extinction. Within a comparatively short time it has completely disappeared from several of the islands which it formerly inhabited, and it is said that the birth rate is now considerably below the death rate.

So far as is at present known the Philippine tribes belonging to the Indonesian race are confined to the great island of Mindanao, the surface of which constitutes about one-third of the total land area of the archipelago. It is possible that a more careful study of the wild peoples of North Luzon will show that here also there exist Indonesian tribes or tribes showing evidences of Indonesian origin; but this is a question which remains to be determined.

The Philippine representatives of this race are physically superior not only to the Negritos, but to the more numerous Malayan peoples as well. They are tall and well developed, with high foreheads, aquiline noses, wavy hair, and often with abundant beards. The color of their skins is quite light. Many of them are very clever and intelligent. None of the tribes have been Christianized. Some of them have grown extremely fierce and warlike as a result of their long struggle with hostile Malayan peoples. Others, more happy in their surroundings, are pacific and industrious.

The great majority of the inhabitants of the Philippines are of Malayan extraction, although the race is not found pure in any of the islands, but is everywhere more or less modified through intermarriage with Chinese, Indonesians, Negritos, Arabs, and, to a limited extent, Spaniards and other Europeans.

The individuals belonging to these Malayan tribes are of medium size, with straight black hair. As a rule the men are beardless, and when they have a beard it is usually straggling and appears late in life. The skin is brown and distinctly darker than that of the Indonesians, although very much lighter than that of the Negritos. The nose is short and frequently considerably flattened.

The representatives of these three races are divided into numerous tribes, which often differ very greatly in language, manners, customs, and laws, as well as in degree of civilization. In numerical importance they range from the Visayans, numbering more than 2,600,000, to the Calanganes, of whom but a bare 300 remain. The greater part of the tribes are wild and pagan, but the civilized and Christianized peoples, although few in number, include the majority of the inhabitants.

That the Filipinos do not constitute "a nation," or "a people," will appear from the perusal of the following table, which gives the names of the various tribes so far as known, the regions which they respectively inhabit, and, where practicable, an estimate of the number of individuals composing each.

It may seem strange that in some instances the same name should appear repeatedly in the list of tribes. The explanation is that in different localities very distinct people sometimes bear the same appellation. There is almost nothing in common, for instance, between the Manguianes of Mindoro and the tribe known under the same name in the island of Sibuyan, while many of the Negrito tribes are so little known that it is impossible to say even whether they are of pure blood or greatly modified by intermarriage with other peoples.

*Tribe, number, and habitat.*

## THE NEGRITO RACE.

| Local name of tribe. | Number.   | Habitat.  |
|----------------------|-----------|---|
| 1. Aetas .....       | (?)       | Pangasinan (Luzon).   |
| 2. Aetas .....       | (?)       | Zambales (Luzon).   |
| 3. Attas .....       | (?)       | Province of Cagayan, in Luzon, and the eastern mountain chain down to the Pacific coast.                          |
| 4. Buquiles .....    | (?)       | Mindoro.  |
| 5. Buquiles .....    | (?)       | Zambales (Luzon).   |
| 6. Mamánuas .....    | 3,000     | Shores of Mainit Lake; peninsula of Surigao, and the coast mountain chain on the Pacific down to Tago (Mindanao). |
| 7. Manguíanas .....  | (?)       | Mindoro (part).   |
| 8. Manguíanas .....  | (?)       | Tablas and Sibuyan (part).  |
| 9. Manguíanas .....  | (?)       | Masbate (part).   |
| 10. Manguíanas ..... | (?)       | Ticao (part).   |
| 11. Negritos .....   | (?)       | Province of Bataan, island of Luzon.  |
| 12. Negritos .....   | (?)       | Vicinity of Pilig, Albay Province, southeast Luzon.   |
| 13. Negritos .....   | (?)       | North Ilocos (Luzon).   |
| 14. Negritos .....   | (?)       | South Ilocos (Luzon).   |
| 15. Negritos .....   | (?)       | Tayabas (Luzon).  |
| 16. Negritos .....   | (?)       | North Camarines (mountains of Capalonga, Mambulag, Paracale, Bacod, etc.) (Luzon).                                |
| 17. Negritos .....   | (?)       | Nueva Ecija (Luzon).  |
| 18. Negritos .....   | (?)       | Iloilo (Panay).   |
| 19. Negritos .....   | (?)       | Negros.   |
| 20. Negritos .....   | (?)       | Vicinity of Iriga (south Camarines) (Luzon).  |
| 21. Negritos .....   | (?)       | Albay (Luzon).  |
| Total .....          | 25,000(?) |   |

## THE INDONESIAN RACE.

(Confined to Mindanao.)

|                      |            |   |
|----------------------|------------|---|
| 1. Atás .....        | 21,000 (?) | In the regions near Mount Apo, on the western and north-western sides.  |
| 2. Bagóbos .....     | 12,000     | Foot hills of Mount Apo (east and south).   |
| 3. Bilanes .....     | 1,500      | Two of the Sarangani Islands and the eastern part of Lake Buluan.   |
| 4. Calanganes .....  | 300        | Gulf of Davao.  |
| 5. Dulanganes .....  | ?          | The forests and mountains distant some 45 miles from Tamontaca toward its southeast coast.  |
| 6. Guiangas .....    | 6,400      | Eastern and southern slopes of Mount Apo.   |
| 7. Mandayas .....    | 30,000     | The valley of the river Salug and the eastern coast of Mindanao from Tandag to Matti; very numerous.  |
| 8. Manguangas .....  | (?)        | The left-hand tributaries of the river Salug.   |
| 9. Manobos .....     | 20,000     | Very numerous in the valley of the river Agusan. In much smaller numbers to the northward of the Bay of Malalag, Gulf of Davao, and on Cape St. Augustine and in the district of Cottabato. |
| 10. Monteses .....   | 25,000     | Between Gilingog and Nasipit and in the mountains and valleys of Tagoloan.  |
| 11. Sámales .....    | 1,000      | Island of same name in the Gulf of Davao.   |
| 12. Subanos .....    | 70,000 (?) | Kingdom of Sibuguey.  |
| 13. Tagabauas .....  | 30,000 (?) | North shore of the Gulf of Davao.   |
| 14. Tagabelies ..... | 10,000 (?) | To the east of Lake Buluan.   |
| 15. Tagacaolos ..... | 14,000     | Malalag and the mountains of Aguinintan and the farther coast of St. Augustine.   |
| 16. Tirurayes .....  | 10,000     | In the mountains to the left of the Rio Grande.   |

## THE MALAYAN RACE.

|                       |           |  |
|-----------------------|-----------|--|
| 1. Abunlon .....      | (?)       | Zambales (Luzon).  |
| 2. Adaugtas .....     | (?)       | The extreme north of the cordillera of the western Caraballos (Luzon).   |
| 3. Allabanes .....    | (?)       | Panay.   |
| 4. Apayanos .....     | 3,000 (?) | From North Ilocos to the highest part of the Grand Cordillera (Luzon).   |
| 5. Aripas .....       | 1,000 (?) | Neighborhood of Tabang (Luzon).  |
| 6. Attas .....        | (?)       | The forests of south Camarines (Luzon).  |
| 7. Balugas .....      | 3,000 (?) | Eastern Cordillera of Nueva Ecija, Tayabas, and Zambales, eastern mountains of the North and South Ilocos provinces (Luzon). |
| 8. Bicoles .....      | 518, 100  | Albay, Ambos Camarines, and a part of Tayabas (Luzon).   |
| 9. Bulalacaunos ..... | (?)       | North of Palawan and Calamianes group.   |
| 10. Buquils .....     | (?)       | Mindoro, in the neighborhood of Baco and Subuan.   |
| 11. Buriks .....      | (?)       | Western slope of the eastern Caraballos, district of Lepanto (Luzon).  |

*Tribe, number, and habitat—Continued.*

## THE MALAYAN RACE—Continued.

| Local name of tribe.     | Number.    | Habitat.   |
|--------------------------|------------|--|
| 12. Búsaos .....         | (?)        | Near Benang, to the north of the Buriks (Luzon).   |
| 13. Cagayanis .....      | 166,300    | Provinces of Cagayan and Isabella (Luzon).   |
| 14. Cadamas .....        | (?)        | Mabucog, valley of the river Chico on the side of Itaves.  |
| 15. Calibuganes .....    | (?)        | Gulf of Sibugey (Luzon).   |
| 16. Calingans .....      | (?)        | To the north of the Cadamas, between the Rio Grande of Cagayan and the Abulog or Apayao (Luzon).                       |
| 17. Catalanganes .....   | 3,000 (?)  | Eastern branch of the river Ilogan (Luzon).  |
| 18. Catatungas .....     | (?)        | Panay.   |
| 19. Cimarrones .....     | (?)        | South Camarines, Isurog Mountain (Luzon).  |
| 20. Dumagas .....        | (?)        | From Baler and Casiguran to the north coast of the Pacific side of Luzon.  |
| 21. Gaddanes .....       | 10,000 (?) | From the river Gadet to the river Chico of Cagayan. They live to the north of the Ilogaos (Luzon).                     |
| 22. Guinanganes .....    | (?)        | Nueva Vizeaya (Luzon).   |
| 23. Guinamutes .....     | 6,000 (?)  | Province of Abra (Luzon).  |
| 24. Hibilos .....        | 4,000 (?)  | Neighbors of the Ilongotes (Luzon).  |
| 25. Ilogaos .....        | 23,000 (?) | Missions of Ilog and Panigui, eastern Caraballos (Luzon).  |
| 26. Igorrotes .....      | (?)        | Mount Irriga, provinces of South Camarines, Abra, Pangasinan, Nueva Vizeaya, Zambales, Panpanga, etc. (Luzon).         |
| 27. Hocanos .....        | 441,700    | North and South Hocos (Luzon).   |
| 28. Ilongotes .....      | 4,000 (?)  | South Caraballo and Caraballo of Baler; Casiguran, in the district of Principe (Luzon).                                |
| 29. Irayas .....         | 3,000 (?)  | Banks of the River Ilogan, eastern slopes of Sierra Madra, on the side of Nueva Vizeaya, Isabela, and Cagayan (Luzon). |
| 30. Isinayes .....       | 4,000 (?)  | Panay.   |
| 31. Itatapnanes .....    | (?)        | To the east of the Busaos, bounded on the south by the Igorrotes of Benguet and on the north by the Guinanes (Luzon).  |
| 32. Manguianes .....     | (?)        | Mindoro, between Abra, Ilog, and Pinamalayan.  |
| 33. Manguianes .....     | (?)        | Mindoro, to the south of Pinamalayan and the island of Sibuyan.  |
| 34. Moros .....          | 100,000    | The Sulu Archipelago.  |
| 35. Moros .....          | (?)        | The Mohammedans from Baguan, near the Gulf of Mayo northward to Daron to the south of Dayao (Mindanao).                |
| 36. Moros .....          | (?)        | The Rio Grande, Malanao, and Ilana Bay (Mindanao).   |
| 37. Pampangas .....      | 337,900    | Pampanga (Luzon).  |
| 38. Pangasinanes .....   | 365,500    | Pangasinan (Luzon).  |
| 39. Sámables Lauts ..... | (?)        | Coast region of Basilan.   |
| 40. Sangüiles .....      | (?)        | Northeast of Sarangani (Mindanao).   |
| 41. Tagalogs .....       | 1,663,900  | Manila and the center of Luzon.  |
| 42. Tagbanias .....      | (?)        | Islands from Palawan to the Calamianes.  |
| 43. Tandolanos .....     | (?)        | Eastern coast of Palawan.  |
| 44. Tinguianes .....     | 16,000 (?) | The Cordillera of Tila, district of Lepanto, and the province of Abra (Luzon).   |
| 45. Tinitianos .....     | 2,500      | Eastern part of Palawan.   |
| 46. Visayas .....        | 2,601,600  | Visayan Islands and some towns on the coast of Mindanao.   |
| 47. Yacanes .....        | (?)        | Interior of Basilan.   |

Total tribes, 84.

It will be noted that the information as to the number of individuals constituting these various tribes is extremely incomplete, and it is to be feared that even such figures as are obtainable are far from reliable. It is extremely difficult to arrive at anything approaching a correct estimate of the numbers of even the more important civilized tribes. Considerable differences exist between the statements of different authorities as to populations of those provinces which are best known, while the Spanish official statistics are notoriously unreliable. Such estimates as exist as to the numerical importance of the various wild tribes are at the best mere guesses.

In attempting to determine the numbers of the different civilized peoples one meets the further obstacle that many provinces are inhabited in part by Christians and in part by savages. In some instances the populations given for these regions are manifestly intended to include the wild as well as the civilized inhabitants, but there is no means of telling how many fall under the one head and how many under the other. In other cases it is expressly stated that the uncivilized natives are not included, and oftener yet there is no statement at all on the subject, so that one is left in doubt.

These difficulties are met with chiefly in the island of Luzon, and are due to the presence there of six civilized tribes, as well as very numerous wild tribes. In estimating the population the plan has been followed of assigning to each of these several civilized tribes all of the inhabitants given for those provinces where it is known to predominate. In some provinces, however, it is impossible to follow this course, as representatives of several of the civilized tribes occur, and there is no way of determining in what proportions. It will be found, therefore, that the summary of population by tribes falls below the summary which takes into consideration only the total number of inhabitants recorded for each province, district, or comandancia; the latter total, according to the statistics which have been followed in this report, is 6,709,810. Any estimate of the total population must manifestly depend on the number of inhabitants assigned to the various wild tribes, of which there are no less than 69.

For the purposes of this report the commission has adopted as the total figure 8,000,000, considering this a conservative estimate. Baranera, whose figures are believed to be carefully prepared, places the total at 9,000,000.

The extent of territory occupied in whole or in part by each of the more important civilized tribes can be estimated with a greater degree of accuracy, and is approximately as follows:

| Tribe.           | Approximate<br>number of<br>individuals. | Territory oc-<br>cupied. |
|------------------|--|--------------------------|
|                  |  | <i>Square miles.</i>     |
| Visayans.....    | 2,601,600                                | 28,100                   |
| Tagalogs.....    | 1,663,900                                | 15,380                   |
| Bicolos.....     | 518,100                                  | 6,900                    |
| Ilocanos.....    | 411,700                                  | 6,170                    |
| Pangasinans..... | 365,500                                  | 1,950                    |
| Pampangas.....   | 357,900                                  | 1,950                    |
| Moros.....       | 268,000                                  | 12,860                   |
| Cagayans.....    | 166,300                                  | 11,050                   |

All of these peoples, although ignorant and illiterate, are possessed of a considerable degree of civilization, and, with the exception of the Mohammedan Moros, are Christianized.

Of the wild tribes in general it may be said that while many of them are pacific and quite harmless so long as they are decently treated, not a few are decidedly the reverse. Head hunting is practiced by several of the peoples of north Luzon, some of whom have even been accused of eating portions of the bodies of their victims. A considerable number of the wild tribes not only practice polygamy, but take and keep slaves. Human sacrifices are indulged in by at least two of the tribes in the interior of Mindanao. It should be clearly borne in mind, however, that the whole number of individuals included in the group of wild peoples is far below that composing the comparatively few civilized tribes.

#### ETHNOGRAPHY.

[Prepared from Blumentritt, *Vers. Einer Ethnog. der Philip.*]

There are in the Philippine Archipelago only four race stems—the Negritos, the Malays, the Chinese, and the Japanese. The Negritos were the primitive inhabitants of the islands, and, according to Pro-

fessor Virchow, have no ethnographical relation to any other race either living or dead. They are almost dwarfs, and extremely primitive in their habits. The Malays have come to the Philippines in successive invasions, lasting even to our own time. They have almost always come by way of Sumatra and Borneo, and thus from south to north have overspread the entire group. They form the vast bulk of the population. The Chinese have come at various times—once in the early days of Spanish rule as invaders, and since that time as merchants and traders. They are tolerably numerous. The Japanese are few and unimportant. The Malays are split into very many tribes, every tribe having distinctive habits and language.

The following is a detailed list of the tribes inhabiting the archipelago, with the localities they occupy, their religion, and their condition of independence or subjection to foreign rule noted. All those who are neither Christians nor Mohammedans are called pagans. This paganism is the aboriginal worship of the Malays, and is sometimes accompanied by sacrifices and sometimes is of a more gentle character. Those tribes which are in the Spanish sphere of influence are called dependent, and those tribes which are either altogether outside of the Spanish sphere of influence, or else have always preserved their independence in the mountainous districts of islands nominally under Spanish rule, independent. It is, of course, to be remembered that the Christianity of many of these tribes is nominal and superficial.

#### NEGRITOS, OR AETAS.

These are the original inhabitants of the Philippines. They were conquered and largely exterminated by the successive Malay invasions and are now to be found scattered in small numbers throughout the archipelago. The only part of the islands where they still inhabit the seacoast is on the northeast coast of Luzon. In Luzon and the Visayas alone they have been estimated at 10,000 and for the whole group 25,000, but no accurate statistics are possible.

#### BALUGAS.

These people are a cross between the Negritos and the Malays. They are sometimes called black Mestizos. They are few in number and are found in Pangasinan and Luzon.

#### MALAYS.

In northern Luzon the following tribes are found:

*Zambales*.—These people dwell in the middle and southern part of the province of Zambales and in the northern part of the province of Bataan. They are independent and wild and almost entirely pagans.

*Pangasinanes*.—These people inhabit the westerly and southerly coast of the gulf of Lingayen and also the coast of Pangasinan. They are dependent and largely Christianized.

*Ilocanos*.—These people inhabit the provinces of Ilocos Norte, Abra, Ilocos Sur, and La Union, and are found in the interior of Pangasinan and in other provinces of Luzon. They are dependent and Christians.

*Cagayanes, or Ibanags*.—These people inhabit the Babuyan group of islands and the Batanes Islands and also the coast districts of the province of Cagayan. In Luzon they are Christians and dependent, but in the smaller islands they are wild and pagans.

*Igorrotes*.—Under this name is included the Igorrotes proper and the Busaos and Buricks, as they have a common language. These three tribes inhabit the provinces of Benguet, Lepanto, Tiagan, and Bontoc. They are found also in the provinces of Abra, Nueva Vizcaya, and Isabella. They are also scattered in other provinces in the north, and to the south they are found in Apayao, Cebucan, and Baguias, as well as in the valley of Benguet. They are almost entirely pagans, although they have been nominally subjugated by many bloody wars.

*Altasanes, Ilanuns, Bujuanos, and Pannipuyes*.—These four tribes are related to the Igorrotes, and very little is known about them. They are wild and probably pagans, and are found principally in the provinces of Nueva Vizcaya and Isabella.

*Isinays*.—These people inhabit the province of Ituy. Most of them are still wild and pagans, though some are Christianized.

*Abacas*.—These people are found in the neighborhood of Carangian. They are Christians.

*Italonos*.—These people inhabit the province of Nueva Vizcaya. They are all Christians and dependent.

*Ibilaos*.—These people inhabit the provinces of Nueva Vizcaya and Nueva Ecija. They are wild and independent and pagans.

*Llongotes*.—They are found in the provinces of Nueva Vizcaya, Isabella, and Principe. They are pagans and wild.

*Mayoyaos*.—These are a quite numerous people, found in the border districts of the provinces of Bontoc and Nueva Vizcaya. They are pagans and wild.

*Ifugaos*.—These people are related to the Mayoyaos and are found in the province of Nueva Vizcaya. They are wild and pagans.

*Gaddanes*.—Found principally in the Commandancia Saltan and also in the provinces of Isabella, Nueva Vizcaya, and Cagayan. They are partly Christian and partly pagan, and are still independent for the most part.

*Itatapanes*.—These people live west of the Igorrote country. In other respects they are like the Gaddanes.

*Guianes*.—These people inhabit the mountains between the provinces of Abra and Cagayan. They are pagans, and are wild and warlike.

*Calanos or Itares*.—They live on the Rio Grande de Cagayan. They are wild and independent, and pagans.

*Gamunanges, Bayabonanes, Dadayags, Nabayuganes, Aripas, and Calingags*.—These are small tribes living in the neighborhood of the Rio Grande de Cagayan. They are pagans, and are wild and independent.

*Tinguianes*.—These people form a rather numerous tribe, and are found in three provinces—Ilocos Sur, Abra, and Ilocos Norte. Part are Christian and the remainder pagans, but only a small portion of them have kept their independence.

*Adungs*.—These people inhabit the northwest corner of Luzon. They are Christians and nominally dependent.

*Apayaos*.—These people inhabit the mountainous region bordering the river Apayao. Some are Christians and dependent, but many are still wild and pagans.

*Catalanganes*.—These people inhabit the province of Isabella. They are probably a mixture of Chinese and Irayas, of whom they are a branch. They are pagans, but nominally dependent.

*Irayas*.—These people live south of the Catalanganes, and like them they are pagans and only nominally dependent.

In central Luzon the following tribes are found:

*Pampangoes*.—These people live in the following provinces: Pinar, Tarlac, Pampanga, Bataan, Zambales, and Nueva Ecija. They are dependent and are Christians.

*Iagalos*.—This is the most important of the Malay tribes. They have been estimated at 1,500,000, but any accurate statistics in regard to their numbers are not obtainable, even though they are and always have been more completely under Spanish rule than any of the other Malay tribes. They people the following provinces in Central Luzon: Manila, Laguna, Cavite, Batangas, Bulacan, Morong, Infanta, Tayabas, Bataan, and Corregidor island in Manila Bay. They are also found in considerable numbers in the provinces of Zambales, Principe, Isabella and Nueva Ecija. They also occupy the entire coast of the island of Mindoro and of the island of Marinduque and are found in considerable numbers all over the archipelago. They are entirely Christianized.

*Catubanganes*.—These are a small tribe living in the mountains in the province of Tayabas. They are wild, independent, and pagans.

Southern Luzon is inhabited entirely by—

*Vicols*.—They inhabit the provinces of Camarines Norte and Tayabas, also the provinces of Camarines Sur and Albay. They also dwell in the islands of Masbate, Ticao, Burias, and the island group of the Capanduanes. Most of them are Christian and dependent, but in the mountains there still exist numbers of wild and pagan Vicols.

Outside of the island of Luzon, in the other islands of the archipelago, are found the following tribes of Malays:

*Munquianes*.—Under this name are comprised the half-wild Malay tribes which inhabit the interior of the island of Mindoro and the mountains of the islands of Romblon and Tablas. They are pagans.

*Mundos*.—These people inhabit the islands of Zebu and Panay. They are wild and pagans.

*Visayas*.—The Visayas inhabit all the islands south of Luzon, Masbate, Burias, Ticao, and Mindoro, and north of Borneo, Sulu, and Mindanao. They also inhabit the whole north and east coast of Mindanao. They are Christians and largely dependent.

*Manobos*.—These people are found in almost every part of the island of Mindanao. They are pagans and entirely independent.

*Tagbalays, Bagobos, Guiangas, Vilanes, Tagacaolos, Sangwils, Mandayas, Subanos, Manguangas*.—These nine tribes inhabit Mindanao. They vary in size and importance, and are all pagans and entirely independent. Very little is known of them, and it is impossible to give further particulars.

*Sameacas*.—These people inhabit the mountainous interior of the island of Basilan. They are pagans and independent.

*Quimbas*.—These people inhabit the mountainous districts of the island of Sulu. Part are Mohammedans and the rest pagans.

*Moros*.—Under this title the Spaniards included all the piratical Moslem tribes which inhabit the greater part of Mindanao and which form the coast population of the greater Sulu Island and the entire population of the lesser Sulu Islands, and are found in other islands in the archipelago. They were roughly classified under the following tribal names: Joloanos (Sulu), Camucones (dwellers of the islands southwest of Tawi Tawi), Tirones (dwellers of the islands between Tawi Tawi and Borneo), Moros de Balabac (island of Balabac), Samales



(dwellers of the islands south of Basilan), Illanos or Ilanos (from the Bay of Illana), Lutaos (from Zamboanga, Mindanao), Malanos (from the Lake Mindanao), Mindanos (the island of Mindanao), Tegurayes or Tinivayanes (Rio Grande of Mindanao). These tribes are a mixture of the Visayas, Manobos, Mandayas, and Subanos races, with Mohammedan races which came in from Borneo and the Moluccas. They are practically all Mohammedans, even if, in some instances, only superficially converted, and they are completely independent. Formerly their chief employment was piracy, but since the suppression of these depredations they have taken chiefly to shipbuilding.

*Chinese.*—The Chinese in the Philippines inhabit chiefly Manila, though they are found at other centers of population in the archipelago. In Manila alone they numbered in 1880, 20,000.

*Chinese Mestizos.*—There are probably over 200,000 Chinese Mestizos in the Philippines. They are a cross between the Chinese and the Tagalos, and live principally in the neighborhood of Manila. They have always been the intelligent and turbulent portion of the native population. It is interesting to remark that Aguinaldo and all his cabinet, his generals, and his advisers are, without exception, Chinese Mestizos.

*Japanese.*—The Japanese are few in number and live principally in Manila and in Dilao, a suburb of Manila.

The following observations may be made from the foregoing ethnographical statistics. It is safe to assume that including all other races, Negritos, Chinese, Japanese, and Mestizos, there are not more than 500,000 people in the Philippines who do not belong to some tribe of Malays. This estimate is, in fact, probably overliberal. Therefore, assuming the figures of the last Spanish census to be approximately correct, there would be 6,500,000 Malays in the archipelago. This is probably a very great underestimation, but there is no method of correcting these figures. In Luzon we find 37 separate Malay tribes, representing, according to the census already quoted, a population of about 3,500,000 persons. Of these tribes the Tagalos and the Pampangos are the only completely subjected races. Among the others there are doubtless many who pay tribute, but there are also 21 entire tribes dwelling principally in the northern part of Luzon who have always remained unchristianized and independent.

Of the tribes in the remaining islands of the archipelago the only ones over whom the Spaniards ever had substantial authority were the Tagalos, on the seacoast of Mindoro, and the Visayas, in the smaller islands between Mindanao and Luzon. The remaining tribes, notably in Sulu and Mindanao, have been either totally uncivilized and in a state of warlike freedom, or else infused with Moslem civilization and living in sultanates under absolute tyranny, which seems to be the natural form of Malay government.

#### AGRICULTURE, COMMERCE, TRANSPORTATION, AND MANUFACTURES.

Although agriculture is the chief occupation of the Philippines, yet only one-ninth of the surface is under cultivation. The soil is very fertile, and even after deducting the mountainous areas it is probable that the area of cultivation can be very largely extended and that the islands can support a population equal to that of Japan (42,000,000).

The chief products are rice, corn, hemp, sugar, tobacco, coconuts, and cacao. Coffee and cotton were formerly produced in large quanti-

ties—the former for export and the latter for home consumption; but the coffee plant has been almost exterminated by insects and the home-made cotton cloths have been driven out by the competition of those imported from England. The rice and corn are principally produced in Luzon and Mindoro and are consumed in the islands. The rice crop is about 765,000 tons. It is insufficient for the demand, and 45,000 tons of rice were imported in 1894, the greater portion from Saigon and the rest from Hongkong and Singapore; also 8,669 tons (say 60,000 barrels) of flour, of which more than two-thirds came from China and less than one-third from the United States.

The cacao is raised in the southern islands, the best quality of it at Mindanao. The production amounts only to 150 tons, and it is all made into chocolate and consumed in the islands.

The sugar cane is raised in the Visayas. The crop yielded in 1894 about 235,000 tons of raw sugar, of which one-tenth was consumed in the islands and the balance, or 210,000 tons, valued at \$11,000,000, was exported, the greater part to China, Great Britain, and Australia.

The hemp is produced in southern Luzon, Mindoro, the Visayas, and Mindanao. It is nearly all exported in bales. In 1894 the amount was 96,000 tons, valued at \$12,000,000.

Tobacco is raised in all the islands, but the best quality and greatest amount in Luzon. A large amount is consumed in the islands, smoking being universal among women as well as the men, but the best quality is exported. The amount in 1894 was 7,000 tons of leaf tobacco, valued at \$1,750,000. Spain takes 80 per cent and Egypt 10 per cent of the leaf tobacco. Of the manufactured tobacco 70 per cent goes to China and Singapore, 10 per cent to England, and 5 per cent to Spain.

Cocoanuts are grown in southern Luzon and are used in various ways. The products are largely consumed in the islands, but the exports in 1894 were valued at \$2,400,000.

Cattle, goats, and sheep have been introduced from Spain, but they are not numerous. Domestic pigs and chickens are seen around everywhere in the farming districts.

The principal beast of burden is the carabao, or water buffalo, which is used for plowing rice fields as well as drawing heavy loads on sledges or on carts.

Large horses are almost unknown, but there are great numbers of native ponies from 9 to 12 hands high, possessing strength and endurance far beyond their size.

#### COMMERCE AND TRANSPORTATION.

The internal commerce between Manila and the different islands is quite large, but there were no official records found giving exact figures concerning it. It is carried on almost entirely by water, in steamers of 500 to 1,000 tons. There are regular mail steamers once in two weeks on four routes, viz, northern Luzon, southern Luzon, Visayas, and Mindanao; also, a steamer every two months to the Carolines and Ladrões, and daily steamers on Manila Bay. These lines are all subsidized. To facilitate this navigation extensive harbor works have been in progress at Manila for several years, and a plan for lighting the coasts has been made, calling for 43 principal lights, of which

17 have already been constructed in the most substantial manner, besides 16 lights of secondary importance.

There is only one line of railway, built by English capital, running from Manila north to Dagupan, a distance of about 120 miles. The roads in the immediate vicinity of Manila are macadamized and in fairly good order; elsewhere they are narrow paths of soft black soil, which become almost impassable in the rainy season. Transportation is then effected by sledges drawn through the mud by carabaos. There are telegraph lines connecting most of the provinces of Luzon with Manila, and cables to the Visayas and southern islands and thence to Borneo and Singapore, as well as a direct cable from Manila to Hongkong. The land telegraph lines are owned by the Government, and the cables all belong to an English company, which receives a large subsidy. In Manila there is a narrow-gauge street railway, operated by horsepower, about 11 miles in total length; also a telephone system and electric lights.

Communications with Europe are maintained by the Spanish Transatlantic Company (subsidized), which sends a steamer every four weeks from Manila and Barcelona, making the trip in about twenty-seven days; the same company also sends an intermediate steamer from Manila to Singapore, meeting the French *Messagerie* steamer each way. There is also a nonsubsidized line running from Manila to Hongkong every two weeks, and connecting there with the English, French, and German mails for Europe, and with the Pacific Mail and Canadian Pacific steamers for Japan and America.

There has been no considerable development of manufacturing industries in the Philippines. The only factories are those connected with the preparation of rice, tobacco, and sugar. Of the manufactures and arts in which Japan so excels there is no evidence.

#### EXPORTS AND IMPORTS.

It is a difficult matter to give statistics of the imported goods, since the innumerable articles are not entered separately at the custom-house, but for purposes of duty are placed in certain classes. Some of the leading goods may be mentioned, however. From England, all Manchester articles play an important part, together with a number of less significant wares, such as hardware and leather goods. From Germany come better class textiles, tricots, hardware, paper, leather, steel and iron, machinery, etc. From Switzerland, St. Gallen laces, muslins, and silks. From France, Lyon silks, machinery for cigarette making, and paper. From Austria, principally only Vienna furniture and Bohemian glassware. From Belgium is sent glass and glassware, iron, paper, cement, etc. From Russia and America, kerosene, and from the latter country also flour and tinned meats—as Spain exported formerly almost only preserved foods in tins—and wines. Within the last few years she has commenced to import into the Philippines other articles, to compete with the wares of other countries. The Spanish goods are in every way inferior to those of foreign manufacture, but on account of their being free from import duty the prices are considerably lower.

In the following table the exports during the last five years are given. The minor articles have been omitted:

*Principal exports from the Philippines from January 1 to December 31, 1896.*

| To—                      | Sugar.         | Hemp.          | Coffee.        | Tobacco.         | Cigars.          | Sapan wood.    | Copra.         |
|--------------------------|----------------|----------------|----------------|------------------|------------------|----------------|----------------|
|                          | <i>Piculs.</i> | <i>Piculs.</i> | <i>Piculs.</i> | <i>Quintals.</i> | <i>Thousand.</i> | <i>Piculs.</i> | <i>Piculs.</i> |
| Great Britain.....       | 793,165        | 815,044        | 199            | 47,816           | 35,010           | 3,340          | 32,200         |
| United States.....       | 16,000         | 615,651        | .....          | 132              | 180              | .....          | .....          |
| Europe.....              | 774,852        | 5,660          | 928            | 154,930          | 32,610           | .....          | 548,812        |
| Australia.....           | .....          | 83,892         | .....          | 62               | 14,850           | .....          | .....          |
| China, Japan, India..... | 1,379,377      | 61,660         | 307            | 16,076           | 112,540          | 60,323         | 3,896          |
| Canada.....              | 97,920         | .....          | .....          | .....            | 610              | .....          | .....          |
| Divare Breakwater.....   | 526,874        | 74,370         | .....          | .....            | .....            | .....          | .....          |
| Total in 1896.....       | 3,588,188      | 1,531,810      | 1,434          | 219,016          | 195,800          | 53,663         | 585,907        |
| Total in 1895.....       | 3,694,769      | 1,664,590      | 3,287          | 225,677          | 198,270          | 38,919         | 594,469        |
| Total in 1894.....       | 3,109,108      | 1,591,962      | 9,008          | 194,500          | 140,075          | 75,115         | 510,633        |
| Total in 1893.....       | 4,184,296      | 1,282,942      | 5,102          | 230,572          | 433,046          | 76,588         | 188,404        |
| Total in 1892.....       | 3,954,060      | 1,581,100      | 21,801         | 254,063          | 133,404          | 52,452         | 292,536        |

| Articles.       | 1896.        | 1895.        | 1894.        |
|-----------------|--------------|--------------|--------------|
| Sugar.....      | \$14,000,000 | \$12,239,000 | \$12,590,000 |
| Hemp.....       | 11,160,000   | 13,317,000   | 12,750,000   |
| Coffee.....     | 67,500       | 158,000      | 412,000      |
| Tobacco.....    | 2,630,000    | 2,705,750    | 2,310,000    |
| Cigars.....     | 1,990,000    | 1,786,200    | 1,500,000    |
| Sapan wood..... | 70,000       | 58,400       | 102,000      |
| Copra.....      | 2,630,000    | 2,898,000    | 2,500,000    |
| Various.....    | 224,000      | 60,800       | 115,000      |
| Total.....      | 32,771,500   | 33,225,150   | 32,279,000   |

The following statistics in regard to the imports and exports of the Philippine Islands have been compiled from official publications of the various countries mentioned. In the first table, in which an effort has been made to show the trade by countries of origin and destination, the figures for 1897 are given, except in the case of France, Germany, Belgium, India, the Straits Settlements, and Victoria. For these countries the latest figures available relate to 1896; for the trade of Spain, no later ones than those for 1895 can be obtained:

| Countries.               | Imports from Philippines. | Exports to Philippines. |
|--------------------------|---------------------------|-------------------------|
| Great Britain.....       | \$6,223,426               | \$2,063,598             |
| France.....              | 1,990,297                 | 359,796                 |
| Germany.....             | 223,720                   | 774,928                 |
| Belgium.....             | 272,240                   | 45,660                  |
| Spain.....               | 4,819,344                 | 4,973,589               |
| Japan.....               | 1,332,300                 | 92,823                  |
| China.....               | 56,137                    | 97,717                  |
| India.....               | 7,755                     | 80,156                  |
| Straits Settlements..... | 274,130                   | 236,001                 |
| New South Wales.....     | 119,550                   | 176,858                 |
| Victoria.....            | 180                       | 178,370                 |
| United States.....       | 4,383,740                 | 94,597                  |
| Total.....               | 19,702,619                | 9,174,093               |

The average value of the trade of the Philippines is greater than indicated in the above table, having suffered in the past few years on account of political conditions. As will be seen in the statements of the commerce by countries, further on, Great Britain imported from the Philippines in 1893 to the value of \$10,607,000 and exported nearly

\$1,500,000 more than the shipments in 1897. France imports three times as much as she did in 1893, but her exports have diminished in an even larger proportion, from over \$2,000,000 to \$350,000. China imports more than twice as much, but exports considerably less than in 1893. India imports less, but her exports have risen from \$57,000 to \$80,000. The Straits Settlements have lost over \$100,000 in imports and some \$140,000 in exports. The trade with New South Wales has grown, but that with Victoria has greatly diminished, and United States commerce, which was \$9,314,235 in 1893, has fallen to \$4,478,337 in 1897.

The following statements show the principal articles of import and export:

*Principal imports from the Philippines.*

| Countries.          | Temp.       | Tobacco.  | Cocoanuts and copra. | Sugar.      |
|---------------------|-------------|-----------|----------------------|-------------|
| Great Britain ..... | \$3,694,214 | \$716,767 | \$222,404            | \$1,512,703 |
| France .....        | 76,754      | 86,451    | 1,787,198            | .....       |
| Germany .....       | 166,600     | 31,654    | .....                | .....       |
| Japan .....         | 100,993     | 64,477    | .....                | 1,156,411   |
| India .....         | 4,965       | 3,053     | .....                | .....       |
| Spain .....         | .....       | 2,533,150 | .....                | 413,794     |
| United States ..... | 2,701,651   | .....     | .....                | 1,199,202   |
| Total .....         | 6,745,177   | 3,435,552 | 2,009,602            | 4,282,110   |

It must not be inferred from the absence of statistics in regard to some of the above articles that there are no imports into the countries mentioned. They are either covered in the general heading "All other imports" or are classified in some other way.

*Principal exports to the Philippines.*

| Countries.          | Cotton manufactures. | Silk manufactures. | Woolen manufactures. | Apparel. |
|---------------------|----------------------|--------------------|----------------------|----------|
| Great Britain ..... | \$1,268,087          | \$12,205           | \$17,943             | \$6,273  |
| France .....        | 143,223              | 81,720             | 2,493                | 3,912    |
| Germany .....       | 111,028              | 43,792             | 44,208               | 99,246   |
| Japan .....         | 120                  | 4,418              | .....                | 157      |
| United States ..... | 2,164                | .....              | .....                | .....    |
| Total .....         | 1,524,622            | 142,135            | 64,704               | 109,588  |

| Countries.          | Machinery. | Metals, and manufactures of. | Coal.    | Provisions. |
|---------------------|------------|------------------------------|----------|-------------|
| Great Britain ..... | \$151,630  | \$185,413                    | \$16,856 | \$79,455    |
| France .....        | 10,353     | 5,035                        | .....    | .....       |
| Germany .....       | 29,036     | 146,370                      | .....    | 31,654      |
| Japan .....         | 250        | 398                          | 40,996   | 7,129       |
| Total .....         | 191,269    | 337,216                      | 57,852   | 118,538     |

## THE MINERAL RESOURCES OF THE PHILIPPINE ISLANDS

### INTRODUCTION.

This brief memorandum probably covers all the main discoveries in the geology of the Philippines which are of economic interest. It is drawn up from data recorded in the Spanish mining bureau (Inspeccion)

cion de Minas), but not published, manuscript mine reports by the late William Ashburner, verbal information obtained in Manila, and various technical publications of Semper, Santos, Roth, Drasche, Abella, and others.

Only about a score of the islands are known to contain deposits of valuable minerals. These are arranged below in the order of their latitude, to give an idea of their geographical distribution and to facilitate finding the islands on the map. The latitude of the northern end of each is taken as that of the island. The character of the valuable minerals stated in the table will afford a general notion of the resources of the islands.

*Mineral-bearing islands and their resources.*

| Island.               | Latitude<br>(north end). | Character of mineral resources.                          |
|-----------------------|--------------------------|--|
|                       | ° ' "                    |  |
| Luzon.....            | 18 40                    | Coal, gold, copper, lead, iron, sulphur, marble, kaolin. |
| Catanduanes.....      | 14 8                     | Gold.  |
| Marinduque.....       | 13 34                    | Lead, silver.  |
| Mindoro.....          | 13 32                    | Coal, gold, copper.                                      |
| Carraray.....         | 13 21                    | Coal.  |
| Batan.....            | 13 19                    | Do.  |
| Rapu-Rapu.....        | 13 15                    | Do.  |
| Masbate.....          | 12 37                    | Coal, copper.  |
| Romblon.....          | 12 37                    | Marble.  |
| Samar.....            | 12 36                    | Coal, gold.  |
| Sibuyan.....          | 12 30                    | Gold.  |
| Semirara.....         | 12 7                     | Coal.  |
| Panay.....            | 11 56                    | Coal, oil, gas, gold, copper, iron, mercury (?).         |
| Biliran.....          | 11 43                    | Sulphur.   |
| Leyte.....            | 11 35                    | Coal, oil, mercury (?).                                  |
| Cebu.....             | 11 17                    | Coal, oil, gas, gold, lead, silver, iron.                |
| Negros.....           | 11                       | Coal.  |
| Bohol.....            | 10 10                    | Gold.  |
| Panaon.....           | 10 10                    | Do.  |
| Mindanao.....         | 9 50                     | Coal, gold, copper, platinum.                            |
| Sulu Archipelago..... | 6 30                     | Pearls.  |

The distribution of each mineral or metal may now be sketched in somewhat greater detail. In many cases the information given in this abstract is exhaustive, so far as the available material is concerned. The coal fields of Cebu, however, have been studied in some detail by Mr. Abella, and in a few other instances more extended information has been condensed for the present purpose.

**COAL.**

So far as is definitely known, the coal of the Philippine Islands is all of Tertiary age, and it might be better characterized as a highly carbonized lignite. It is analagous to the Japanese coal and to that of Washington, but not to the Welsh or Pennsylvania coals. Such lignites usually contain considerable combined water (8 to 18 per cent) and bear transportation ill. They are also apt to contain much sulphur, as iron pyrite, rendering them subject to spontaneous combustion and injurious to boiler plates. Nevertheless, when pyritous seams are avoided and the lignite is properly handled it forms a valuable fuel, especially for local consumption. In these islands it would appear that the native coal might supplant English or Australian coal for most purposes. Lignite is widely distributed in the archipelago; some of the seams are of excellent width, and the quality of certain of them is high for fuel in this class.

Coal exists in various provinces of the island of Luzon (Abra, Camarines, Bataan, Sorsogon). The finest beds thus far discovered appear to be those in the small island of Bataan, lying to the east of the southern portion of Luzon, in latitude  $13^{\circ} 19'$ . These seams vary from 2 feet 6 inches to 14 feet 8 inches in thickness. Analyses have been made in the laboratory of the Inspeccion de Minas, and the mean of seven analyses gives the following composition:

*Analysis of coal from Bataan, one of the Philippine Islands.*

| Constituent.         | Per cent. |
|----------------------|-----------|
| Water.....           | 13.52     |
| Volatile matter..... | 37.46     |
| Fixed carbon.....    | 41.46     |
| Ash.....             | 4.56      |
| Total.....           | 100       |

One pound of this coal will convert 6.25 pounds of water at  $40^{\circ}$  C. into steam at  $100^{\circ}$  C. The heating effect is about three-fourths that of Cardiff coal. The same beds are known to exist in other small adjacent islands, Carraray and Rapu-Rapu. A number of concessions for coal mining have also been granted on the main island of Luzon just south of Batan at the town of Bacon. No doubt the beds here are either identical or at least closely associated with the coal seams in the little islands.

The coal field of southern Luzon is said to extend across the Strait of San Bernardino into the northern portion of Sinar. Here coal is reported at half a dozen localities, but I have been able to ascertain no details as to the thickness or quality.

In Mindoro there are large deposits of coal in the extreme southern portion (Bulacao) and on the small adjacent island of Semirara. This fuel is said to be similar to that of Batan.

The islands of Masbate and Panay contain coal, the deposits of which thus far discovered do not seem of much importance. Specimens from the southwestern portion of Leyte, analyzed in the laboratory of the Inspección de Minas, are of remarkably high quality, but nothing definite about the deposit is known to me.

The first discovery of coal in the archipelago was made in the island of Cebu in 1827. Since then lignitic beds have been found on the island at a great variety of points. The most important croppings are on the eastern slope within some 15 or 20 miles of the capital, also named Cebu. Though a considerable amount of coal has been extracted here, the industry has not been a profitable one hitherto. This is, at least in part, due to crude methods of transportation. It is said, however, that the seams are often badly faulted.

At Uling, about 10 miles west of the capital, the seams reach a maximum thickness of  $15\frac{1}{2}$  feet. Ten analyses of Cebu coal are at my disposal. They indicate a fuel with about two-thirds the calorific effect of Cardiff coal, and with only about  $\frac{1}{4}$  per cent ash. Large quantities of the coal might, I suspect, contain a higher percentage of ash.

The island of Negros is nearly parallel with Cebu, and appears to be of similar geological constitution, but it has been little explored and little of it seems to have been reduced to subjection by the Spaniards.

There are known to be deposits of coal at Calatrava, on the east coast of Negros, and it is believed that they are of important extent. In the great island of Mindanao coal is known to occur at eight different localities, but no detailed examinations of any kind appear to have been made. Seven of these localities are on the east coast of Mindanao and the adjacent small islands. They indicate the presence of lignite from one end of the coast to the other. The eighth locality is in the western province called Zamboanga, on the Gulf of Sibuguey.

#### PETROLEUM.

In the island of Cebu petroleum has been found associated with coal at Toledo, on the west coast, where a concession has been granted. It is also reported from Asturias, to the north of Toledo, on the same coast, and from Alegria, to the south. Natural gas is said to exist in the Cebu coal fields. On Panay, too, oil is reported at Janimay, in the province of Iloilo, and gas is reported from the same island. Petroleum highly charged with paraffin is also found on Leyte at a point about 4 miles from Villaba, a town on the west coast.

#### GOLD.

Gold is found at a vast number of localities in the archipelago, from northern Luzon to central Mindanao. In most cases the gold is detrital, and is found either in existing water courses or in stream deposits now deserted by the current. These last are called "aluviones" by the Spaniards. It is said that in Mindanao some of the gravels are in an elevated position and adapted to hydraulic mining. There are no data at hand which indicate decisively the value of any of the placers. They are washed by natives, largely with cocoanut shells for pans, though the batea is also in use.

In the province of Abra, at the northern end of Luzon, there are placers, and the gravel of the river Abra is auriferous. In Lepanto there are gold-quartz veins as well as gravels. Gold is obtained in this province close to the copper mines. In Benguet the gravels of the river Agno carry gold. There is also gold in the province of Bontoc and in Nueva Ecija. The most important of the auriferous provinces is Camarines Norte. Here the townships of Mambulao, Paracale, and Labo are especially well known as gold-producing localities. Mr. Drasche, a well-known German geologist, says that there were 700 natives at work on the rich quartz veins of this place at the time of his visit, about twenty-five years ago. At Paracale there are parallel quartz veins in granite, one of which is 20 feet in width and contains a chute in which the ore is said to assay 38 ounces of gold to the ton. One may suspect that this assay hardly represented an average sample. Besides the localities mentioned, many others in this province have been worked by the natives.

The islands of Mindoro, Catanduanes, Sibuyan, Samar, Panay, Cebú, and Bohol are reported to contain gold, but no exact data are accessible.

At the south end of the small island of Panaon, which is just to the south of Leyte, there are gold-quartz veins, one of which has been worked to some extent. It is 6 feet in thickness and has yielded from \$6 to \$7 per ton.

In the island of Mindanao there are two known gold-bearing dis-



tricts. One of these is in the province of Surigao, where Placer and other townships show gravels and veins. The second district is in the province of Misamis. Near the settlement of Imponan, on the Gulf of Macajalar, there are said to be many square kilometers of gravels carrying large quantities of gold, with which is associated platinum. The product of this district was estimated some years since at 150 ounces per month, all extracted by natives with bateas or cocoanut-shell dishes.

#### COPPER.

Copper oars are reported from a great number of localities in the Philippines. They are said to occur in the following islands: Luzon (provinces of Lepanto, Benguet, and Camarines), Mindoro, Capul, Masbate, Panay (province of Antique), and Mindanao (province of Surigao). Many of these occurrences are probably unimportant. The great island of Mindanao, being practically unexplored, is full of possibilities, but as yet no important copper deposit is known to exist there. An attempt was made to work the deposit in Masbate, but no success seems to have been attained. On the other hand, northern Luzon contains a copper region which is unquestionably valuable. The best-known portion of this region lies about Mount Datá, a peak given as "2,500 meters!" in height, lying in latitude  $16^{\circ} 53'$ , longitude  $120^{\circ} 58'$  east of Greenwich, or  $124^{\circ} 38'$  east of Madrid. The range of which Datá forms one peak trends due north to Cape Lacay-Lacay, and forms a boundary for all the provinces infringing upon it.

Datá itself lies in the province of Lepanto. In this range copper ore has been smelted by the natives from time immemorial, and before Magellan discovered the Philippines. The process is a complicated one, based on the same principles as the method of smelting sulpho-salts of this metal in Europe and America. It consists in alternate partial roasting and reduction to "matte" and eventually to black copper. It is generally believed that this process must have been introduced from China or Japan. It is practiced only by one peculiar tribe of natives, the Igorrotes, who are remarkable in many ways.

Vague reports and the routes by which copper smelted by natives comes to market indicate that there are copper mines in various portions of the Cordillera Central, but the only deposits which have been examined with any care are those at Mancayan (about 5 miles west of Mount Datá) and two or three other localities within a few miles of Mancayan. The deposits of Mancayan are described as veins of rich ore, reaching 7 meters in width and arranged in groups. Mean assays are said to show over 16 per cent of copper, mainly as tetrahedrite and allied ores. The gangue is quartz. The country rock is described as a large quartzite lens embedded in a great mass of trachyte. An attempt has been made by white men to work these deposits, but with no considerable success. The failure does not seem to have been due to the quality or quantity of ore found.

#### LEAD AND SILVER.

A lead mine has been partially developed near the town of Cebú, on the island of the same name.

The most important deposit of argentiferous galena is said to be at Torrijos, on the small island of Marinduque (latitude  $13^{\circ} 34'$ ). A metric

ton, or 1,000 kilograms, is said to contain 96 grams of silver, 6 grams of gold, and 565.5 kilograms of lead.

In Camarines, a province of Luzon, lead ores occur, but are worked only for the gold they contain.

#### IRON.

There is iron ore in abundance in Luzon, Caraballo, Cebú, Panay, and doubtless in other islands. In Luzon it is found in the provinces of Laguna, Pampanga, and Camarines Norte, but principally in Bulacan. The finest deposits are in the last-named province, near a small settlement named Camachin, which lies in latitude  $15^{\circ} 7'$  and longitude  $124^{\circ} 47'$  east of Madrid. A small industry exists here, wrought iron being produced in a sort of bloomery and manufactured into plowshares. The process has not been described in detail, so far as I know. It would appear that charcoal pig iron might be produced to some advantage in this region. The lignites of the archipelago are probably unsuitable for iron blast furnaces.

#### QUICKSILVER.

Rumors of the occurrence of this metal in Panay and Leyte have failed of verification. Accidental losses of this metal by prospectors or surveyors sometimes lead to reports of the discovery of deposits, and others are not seldom mistaken for impure cinnabar.

#### NONMETALLIC SUBSTANCES.

Sulphur deposits abound about active and extinct volcanoes in the Philippines. In Luzon the principal sulphur deposits are at Daclan, in the province of Benguet, and at Colasi, in Camarines. The finest deposit in the archipelago is said to be on the little island of Biliran, which lies to the northwest of Leyte.

Marble of fine quality occurs on the small island of Romblon (latitude  $12^{\circ} 37'$ ). It is much employed in churches in Manila for baptismal fonts and other purposes. Marbles are also quarried at Montalban in the province of Manila, and at Binangonan in the province of Marong.

There are concessions for mining kaolin at Los Baños, in Laguna Province.

Pearl fisheries exist in the Sulú Archipelago, and are said to form an important source of wealth.

#### WOODS AND FORESTS.

There are many very valuable woods in the Philippines. The one which is most exported is sapan wood, of which, in 1897, there were 4,187 tons shipped from Manila and Iloilo. This wood is hard, heavy, crooked, and full of knots. It sinks in water and is susceptible of fine polish. The only valuable portions is the heart of the branch, from which is extracted a dye known in the trade as "false crimson" to distinguish it from the more permanent cochineal dye. There are also Philippine trees the sap of which gives a polished coating to the smooth surface of other woods.

The Philippines are also remarkably rich in valuable timber trees of hard wood.

Aranga (*Homalium*) gives logs up to 75 feet long by 24 inches square. It is specially used for sea piling and all kinds of marine work which is subject to the attack of sea worms.

Acle (*Mimosa acle*) gives logs up to 32 feet by 28 inches square. It is strong, tenacious, and durable, while it has the specialty of being difficult to burn and is much used in house building. It polishes well, and is much prized by the natives.

Anagap (*Pithecolobium montanum*, Benth.) gives logs up to 18 feet long by 16 inches square. It is sometimes used for house furnishings and fittings, and for other purposes.

Apiton (*Dipterocarpus griffithi*, Miq.) gives logs up to 77 feet long by 24 inches square. It contains a gum of which incense is made. It is light when seasoned, works well, and will serve for furniture and general joiners' purposes.

Antipolo (*Artocarpus incisa*) is much esteemed for vessels' outside planking, keels, etc. It is light, very strong, resists the sea worm entirely, and effects of climate. It does not warp when once seasoned, and is a most valuable wood.

Anobing (*Artocarpus orata*) is said to resist damp as well as Molave does, but is not appreciated as a good, hard wood. It is plentiful, especially in the district of Laguna de Bay.

Betis (*Azola*, *Payena Betis?*) gives logs up to 65 feet long by 20 inches square. It is proof against the sea worm; is used for salt or fresh-water piling, piers, wharfs, etc. Also for keels and many other parts of ship building where a first-class wood is necessary. It is somewhat scarce.

Batitinan (*Lagerstrœmia batitinan*) gives logs up to 40 feet long by 18 inches square. It is very strong, tough, and elastic, and generally used for ships' outside planking above water. It stands the climate well when properly seasoned. It is a wood of the first quality and can be used for any purpose except interment in the ground or exposure to ravages of the sea worm. This wood is very much stronger than teak and could be used to advantage in its place for almost all purposes.

Banaba (*Munchaustia speciosa*), a strong and useful wood, much used in house and ship building. It is thoroughly reliable when seasoned; otherwise it shrinks and warps considerably.

Bansalague (*Mimusops elengi*.) gives logs up to 45 feet long by 18 inches square. It can be driven like a bolt, and from this fact and its durability it is frequently used for tree nails in ship building in Manila. It is also used for ax and other tool handles, and it lasts well in the ground.

Bancal (*Nauclea glaberrima*) gives logs up to 24 feet long by 24 inches square. This wood is of a yellow color and very easy to work. It is used for general joiners' work in house building, etc.

Cedar (*Cedrela odorata*) of the same natural order as mahogany. Gives logs up to 40 feet long by 35 inches square, and is used principally for cigar boxes.

Camagon or Mabolo (a variety of *Diospyros philoshantera*) is procured in roughly rounded logs of 9 feet and upward in length by up to 12 inches in diameter. It is a close-grained brittle wood and takes a good polish. Its color is black with yellow streaks, and it is used for furniture making.

Dúngon (a variety of *Herculia ambiformis*) grows up to 50 feet long, giving logs up to 20 inches square. It is sometimes called iron wood, and is very hard and durable, and especially strong in resisting great transverse pressure or carrying such weight as a heavy roof.

Dinglas (*Eugenia Sp.*) gives logs up to 30 feet long by 16 inches square. It is very strong, hard, and durable, and will serve as a substitute for black walnut.

Ebony (*Diospyros nigra*). This wood is found in very limited quantities in the Philippines.

Guijo (*Dipterocarpus guijo*) gives logs up to 75 feet long by 24 inches square. Is very strong, tough, and elastic. In Manila this wood is invariably used for carriage wheels and shafts. In Hongkong it is used for wharf decks or flooring, among other purposes.

Ipil (*Eporma decandria*) gives logs up to 50 feet long by 26 inches square. It has all the good qualities of Molave, except resistance to sea worm, in which respect it is the same as teak, and may be as much relied on for duration under ground. For sleepers it equals molave.

Lanete (*Anaser laneti*) gives logs up to 25 feet long by 18 inches square. It is useful for sculpture, musical instruments, decoration, turning, and cabinet purposes.

Lañan (*Dipterocarpus thurifera*) is obtained in sizes the same as guijo. It is a light, useful wood, and easily worked. It is said that the outside planks of the old Philippine-Mexican galleons were of this wood because it did not split with shot.

Molave (*Vitex geniculata*) gives logs up to 35 feet long by 24 inches square. It resists sea worm, white ants, and action of climate, and consequently is specially valuable for work on the surface of or under the ground, and generally for all purposes where an extra strong and durable wood is required. Often growing crooked, it is commonly used for frames of vessels. Owing to its imperviousness to ligniperous insects and climate, it can not possibly be surpassed for such purposes as railway sleepers. This wood is practically everlasting, and is deservedly called by the natives "queen of the woods."

Mangachapuy (*Dipterocarpus mangachapuy*) gives logs up to 55 feet long by 20 inches square. It is very elastic and withstands the climate, when seasoned, as well as teak. It is used in Manila for masts and decks of vessels and for all work exposed to sun and rain. It is much esteemed by those who know its good qualities.

Macasin can be used for interior housework and floors. It is somewhat inferior to banaba, but supplies its place when banaba is scarce. It can be got in greater length and square than banaba.

Malatapay (a variety of *Diospyros philoshantera*), veined black and red. It resembles Camagon.

Mancono is a very hard wood, found in Mindanao Island. It is classed as a species of *lignum-vitæ*.

Narra (*Pterocarpus palidus santalinus*) gives logs up to 35 feet long by 26 inches square. It is the mahogany of the Philippines, and is always employed in Manila in the manufacture of furniture, for, notwithstanding its somewhat open grain, it polishes well and is prettily marked. There is a variety of shades in different logs, varying from straw color to blood red, the former being more common. All are, however, equally esteemed. It is a first-class wood for general purposes. In the London market it is classed with padouk of Burmah.

Palo Maria de Playa is greatly appreciated for crooks and curves,

but as a rule can not be found of suitable dimensions for large vessels. It is better than molave for this purpose, for, due to the absence of acrid juices, iron bolts do not corrode it. It is exceedingly tough and not so heavy as molave.

Supa (*Sindora wallichii*. Benth.) gives logs up to 40 feet long by 28 inches square. It produces an oil, and is a strong wood for general purposes, polishes well, and can be used advantageously for house decorations and furniture.

Tindalo (*Eperna rhomboidea*) is about the same as Acle in its principal features, but not notable for resisting fire. It is useful for general purposes, and in particular for decorations and furniture. It is somewhat brittle, and takes a high polish.

Yacal (*Dipterocarpus plagatus*) gives logs up to 50 feet long by 22 inches square. It is proof against white ants, has great strength and tenacity, and is much valued in Manila for housebuilding, etc.

The hard woods of the Philippines suitable for building and trade requirements as described above are those in general use only. Altogether about fifty kinds exist, but while some are scarce, others do not yield squared logs of sufficient sizes to be of marketable value.

### HARBORS IN THE PHILIPPINES.

#### LUZON:

- Manila Bay—  
Soundings,  $5\frac{1}{2}$  to 30 fathoms. Probably the best harbor in the Pacific.
- Port Cavite—  
Soundings,  $1\frac{1}{2}$  to  $2\frac{3}{4}$  fathoms.
- Laguinmanok Bay—  
Soundings, 4 to 14 fathoms. Open to the south.
- Port Sorsogon—  
Soundings, 3 to 9 fathoms. Well-sheltered harbor.
- Gulf of Maynok—  
Soundings,  $3\frac{1}{2}$  to 8 fathoms. Open to the east.
- Port Pasgo—Gulf of Ragai—  
Soundings,  $3\frac{1}{2}$  to  $5\frac{1}{2}$  fathoms. Open to the southeast.
- Mauban Bay—  
Soundings,  $3\frac{1}{2}$  to  $5\frac{1}{2}$  to 10 fathoms. Very open roadstead to southeast.
- Port Subig—  
Soundings, 11 to 25 feet in the roadstead.
- Port Silanguin—  
Soundings, 10 to 28 feet. Open roadstead.
- Port Masingluk—  
Soundings,  $6\frac{1}{2}$  to 16 fathoms. Good harbor.
- Port Mataloi—  
Soundings, 5 $\frac{1}{2}$  to 14 fathoms. Good harbor.

#### ISLAND OF MINDANAO:

- Sibuko Bay—  
Soundings, 11 to 27 fathoms. Very open to the east.
- Dapitan Bay—  
Soundings,  $3\frac{1}{2}$  to 17 fathoms. Very open to the northwest.
- Kanalasan Cove—  
Soundings,  $5\frac{1}{2}$  to 27 fathoms. Open to the north.
- Port Misamis—  
Soundings,  $1\frac{1}{2}$  to 7 fathoms. Goes far into the coast.
- Palak (Pollok) Harbor—  
Soundings,  $3\frac{1}{2}$  to 26 fathoms. Open to the east.
- Port Sarigao—  
Soundings, 11 to 17 fathoms. Very open to the north.
- Caldera Bay—  
Soundings,  $5\frac{1}{2}$  to  $9\frac{1}{2}$  fathoms. Open roadstead.
- Pajaga Bay—  
Soundings,  $4\frac{1}{2}$  to 30 to 55 fathoms. Very large, deep, and fine harbor.

## ISLAND OF MINDANAO—Continued.

## Port of Santa Maria—

Soundings, 9 to 15 fathoms. Sheltered harbor.

## Port Palompon—

Soundings, 4 to 12 fathoms. Very open to east and south.

## Batiunny Bay—

Soundings,  $4\frac{1}{4}$  to 26 fathoms. Open to northwest.

## MASBATE ISLAND:

## Nin Bay—

Soundings,  $1\frac{1}{2}$  to 9 fathoms. Open to the southwest.

## Port Mandaon—

Soundings,  $3\frac{1}{2}$  to 9 fathoms. Sheltered harbor.

## Port Barrera or Lanan—

Soundings,  $3\frac{1}{4}$  to 6 fathoms. Shoals near shore.

## Port Kataniyan—

Soundings,  $3\frac{1}{4}$  to 17 fathoms. Deeply indented and sheltered.

## Port Palanog—

Soundings,  $3\frac{3}{4}$  to 30 fathoms. Sheltered and fine harbor.

## CEBU ISLAND:

## Port Cebu, between Cebu Island and Maktan Island—

Soundings,  $2\frac{1}{2}$  to 8 fathoms.

## SAMAR ISLAND:

## Port Palapa—

Soundings,  $5\frac{1}{2}$  to 12 fathoms. Open to the north.

## Katkulogan, Bari, and Parajuai anchorages—

Open anchorages with good soundings.

## Port Libás—

Soundings,  $3\frac{1}{4}$  to  $5\frac{1}{2}$  to 17 fathoms. Good harbor.

## SULU ARCHIPELAGO:

## BASILAN ISLAND:

## Malusa Bay—

Soundings, 6 to 12 fathoms. Very open to the southwest.

## SULU ISLAND, NORTHEAST COAST:

## Dalrymple Harbor—

Soundings,  $6\frac{1}{2}$  to 9 fathoms. Very open to the northeast and northwest.

## TAWI TAWI GROUP:

## Bongao anchorage—

Soundings, from  $3\frac{3}{4}$  to 7 fathoms.

## North coast of Tawi Tawi—

Port dos Amigas, from 26 to 46 feet. Shoals near the shore, but good anchorage.

## MINDORO:

## Port Galera—

Soundings,  $3\frac{1}{2}$  to 15 fathoms. Sheltered harbor.

## Varadero Bay—

Soundings,  $3\frac{1}{2}$  to 12 fathoms. Open to the southeast.

## Sablayan anchorage—

Soundings,  $3\frac{1}{2}$  to 16 fathoms. Very open to the south.

## Paluan Bay—

Soundings, 6 to 30 fathoms. Very open to the south.

## PANAY ISLAND:

## Port Iloilo—

Soundings,  $4\frac{3}{4}$  to 17 fathoms; soundings in the river,  $2\frac{1}{2}$  to 3 fathoms. In the passage between Panay and Guimaras Island.

## Port Batan—

Soundings,  $4\frac{1}{2}$  to 7 to 9 fathoms. Well sheltered.

## PALAWAN:

## West coast—Harbor of Palawan—

Soundings, 4 to 25 fathoms. Deep, but open to the northnorthwest.

## East coast—Port Royalist—

Soundings,  $4\frac{1}{2}$  to 25 fathoms. Sheltered harbor.

## Port Talm Dak—

Soundings,  $1\frac{1}{2}$  to  $3\frac{1}{2}$  to 10 fathoms. Open roadstead.

## KALAMION OR KALION ISLAND:

## Port Kalion—

Soundings, 6 to 15 fathoms. Well-sheltered harbor.

## GUIAMARAS ISLAND:

Port Baluagan or Santa Ana—

Soundings,  $3\frac{1}{4}$  to 9 fathoms. Sheltered harbor.

## DINAGAT ISLAND:

Port Gabo—

Soundings, 12 to 18 fathoms. Open to the southeast.

## BUKAS ISLAND:

Port Sibonga—

Soundings, 6 to 11 fathoms. Well sheltered (in part unsurveyed).

## MAESTRO DE CAMPO ISLAND:

Port Concepcion—

Soundings,  $3\frac{1}{2}$  to 21 fathoms. Open to the east and southeast.

## SIKIJOR ISLAND:

Port Kanvan—

Soundings,  $2\frac{1}{2}$  to 14 fathoms. Open to the northwest.

## BURIAS ISLAND:

Port Basainga—

Soundings,  $1\frac{1}{2}$  to 7 fathoms. Sheltered, and shoals near shore

Port Busin—

Soundings,  $3\frac{1}{2}$  to 12 fathoms. Sheltered harbor.

## KANAHUAN ISLANDS:

Anchorages between the islands from  $3\frac{1}{4}$  to 12 fathoms.

## TIKAO ISLAND:

San Jacinto—

Soundings,  $5\frac{1}{2}$  to 17 fathoms. Open to the northeast.

Port San Miguel—

Soundings,  $6\frac{1}{2}$  to 31 fathoms.

## LUBANG ISLAND:

Luk Bay—

Soundings,  $5\frac{1}{2}$  to 10 fathoms. Open to the east.

## ROMBLON ISLAND:

Soundings, 6 to 21 fathoms. Good harbor.

## TABLAS ISLAND:

Port Luk—

Soundings,  $5\frac{1}{2}$  to 17 fathoms. Very well sheltered and fine harbor.

## BASUANGA ISLANDS:

Good harbor on south side.







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